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## ENHANCING FINANCIAL EDUCATION: DEVELOPING STUDENT FINANCIAL KNOWLEDGE THROUGH GAMIFICATION

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**Abstract:** This study aims to examine the impact of gamification on financial knowledge through student enjoyment and student engagement. Financial education has shifted from conventional learning activities, increasingly leveraging technology to enhance knowledge. However, previous research has yet to extensively explore the mechanisms by which gamification in financial education affects financial knowledge. This study employs a quantitative approach to examine the relationships between variables. The sampling technique used was purposive sampling, with 289 students participating as respondents. The results were tested using VB-SM to analyze the influence between variables. The findings indicate that gamification has a positive impact on student enjoyment and student engagement. This study demonstrates that gamification does not directly influence students' financial knowledge. Student engagement fully mediates the effect of gamification on students' financial knowledge, whereas enjoyment does not affect students' financial knowledge. This study underscores the importance of fostering student engagement in gamification to enhance financial knowledge. The implications of this research include strengthening student engagement through various strategies, such as apperception, motivation, and interaction during the use of gamification in financial education.

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### Introduction

Many people view finance education as overwhelming and complicated, particularly those who are just beginning to learn about personal money management. Applying game-like aspects to non-gaming contexts—known as gamification—has become a viable strategy to improve financial decision-making and financial education. (Hu & Shang, 2018; Zainuddin et al., 2020). Gamification in financial education is crucial because it transforms learning about finances into an engaging and interactive experience (Rodríguez et al., 2018). Incorporating aspects like game dynamics, prizes, and challenges increases learners' motivation to engage and retain the material. This method encourages users to practice practical financial abilities in a risk-free setting by making complicated financial topics more

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approachable and relatable. People get more knowledge and self-assurance in handling their money as a result, which enhances their financial literacy and decision-making.

Gamification has the potential to significantly increase learners' engagement and accessibility with financial ideas. Financial education may become more immersive and interactive by adding game-like elements like points, leaderboards, and narrative-driven challenges. This will ultimately enhance student motivation and engagement. (DuBravac, 2012; Strmečki et al., 2015). This is especially crucial when it comes to financial education, as younger generations who have grown up in a digital, gaming-focused world may find it difficult to engage with traditional teaching approaches (Alsawaier, 2018). Additionally, gamification provides a safe and low-risk environment for students to investigate financial concepts and make choices, allowing them to learn from their mistakes without facing consequences in the real world. (Hu & Shang, 2018). This can be especially valuable for individuals who may be hesitant to engage with financial topics due to a lack of confidence or previous negative experiences (Hanus & Cruz, 2015). Financial education can be improved to be more effective, enjoyable, and accessible to a wider range of learners by utilizing the possibilities of gamification. This, in turn, empowers people to make wiser and more responsible financial decisions throughout their lives (Zainuddin et al., 2020)

In the context of financial education, gamification can play a crucial role in enhancing student motivation and participation (Alsawaier, 2018). Many students find financial concepts and practices dull and disconnected from their daily lives, leading to a lack of interest and engagement (De Freitas et al., 2017). Gamification can help bridge this gap by making financial education more interactive, immersive, and relevant to students' interests and experiences. According Lin (2022) gamification is a technique that uses elements like leaderboards, medals, and points to entice students and make studying more fun. In the context of financial education, where traditional teaching approaches frequently fall short of effectively engaging students, this approach is becoming more and more relevant. A study by García-López et al., (2023) found that gamification has the potential to substantially increase student enthusiasm and engagement, which will enhance the learning process. The efficiency of gamification in improving financial knowledge comes into doubt by the incorporation of gamification in financial education, though, because the connection between engagement, enjoyable, and information retention is still not well understood.

A flow state occurs when individuals are fully immersed in an activity, experiencing heightened focus and enjoyment (Prior et al., 2016). In educational settings, achieving this state can lead to deeper learning and better retention of information. For instance, research by Bai et al., (2020) demonstrated that students who experienced flow during gamified learning activities showed higher levels of engagement and better academic performance. However, while these platforms can boost participation, they may inadvertently lead to a focus on game mechanics rather than substantive learning (Buckley & Doyle, 2016). This highlights the need for careful design and implementation of gamified elements in finance education to avoid diluting the subject's complexity. Another critical aspect to consider is the potential for gamification to create a false sense of mastery. (Oliveira et al., (2022) suggests that while gamified learning can enhance engagement, it may not necessarily correlate with improved knowledge retention or application. Students may perform well in quizzes or games but struggle to apply the concepts in real-world scenarios, such as investment analysis or financial forecasting. This disconnect underscores the importance of integrating gamification with traditional pedagogical methods that emphasize critical thinking and problem-solving skills. van der Heide & Želinský (2021) found that younger generations, particularly



Millennials and Gen Z, are more receptive to gamified learning experiences. However, older students or professionals may prefer conventional learning methods that focus on in-depth analysis and theoretical understanding. This divergence necessitates a tailored approach to gamification in finance education, ensuring that diverse learning preferences are accommodated while still delivering rigorous content.

Previous studies have yielded mixed results regarding the effectiveness of gamification in enhancing financial knowledge, despite its potential benefits. Some researchers, such as Chen & Liang, (2022), believe that gamification can result in shallow engagement, where students may find the exercises enjoyable but are unable to understand important financial ideas. This discrepancy emphasises the necessity of more research, especially in the area of financial literacy, to determine how gamification affects student learning results. There is a clear research gap since the mechanisms by which gamification influences students' financial knowledge are not well understood, calling for a thorough investigation of this relationship. There are significant concerns regarding the use of gamification in promoting a deeper comprehension of financial topics given its effect on student engagement. With the goal of creating a more engaging and dynamic learning environment, educational institutions have been incorporating gamified components into their curricula more and more in recent years. Playing interesting financial games may encourage students to take an active role in their education, improving their entire educational experience. According to Yau & Wong (2022), students who engaged in gamified financial simulations showed improved comprehension of financial concepts and increased engagement, indicating that these interactive tools can effectively close the knowledge gap between theory and practice. Finding a balance between participation and the seriousness necessary for successful financial education is still difficult, though. Gamification has the potential to draw in students, but it may also cause some of them to take these activities less seriously, which would diminish their instructional value. This tendency prompts worries about the possibility of shallow learning, in which pupils concentrate more on the game mechanics than on the fundamental financial ideas being taught. To ensure that the educational objectives are reached without sacrificing the integrity of the learning process, educators must carefully craft gamified experiences that both interest learners and emphasise the significance of the subject matter.

More research is necessary since the relationship between gamification and knowledge of finance is still complicated and inconsistent. Although the exact mechanisms by which gamification affects knowledge acquisition remain unclear, it has the potential to improve student engagement and pleasure of financial education. With an emphasis on the functions that engagement and enjoyment play in the learning process, this study aims to investigate these mechanisms. By analysing how these components interact, the research seeks to provide important insights into how gamification might be optimised to improve students' financial literacy and ultimately lead to better financial decision-making.

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### **Research Method**

This study employs a quantitative approach to analyze the influence of gamification on financial knowledge through student enjoyment and student engagement. Quantitative research is a systematic investigation that focuses on quantifying data and uncovering patterns through statistical analysis, with the aim of identifying relationships and testing hypotheses. This research is a form of causal research, which is a type of study focused on





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identifying cause-and-effect relationships between variables. It seeks to determine how changes in one variable directly influence changes in another.

The population of this study consists of university students who have practiced gamification in learning financial education. The sample was obtained using non-probability sampling, specifically purposive sampling. When the population size is unknown, sampling is conducted using Cochran's formula, with a 95% confidence level, a 5% margin of error, and a population proportion of 25%, resulting in 289 respondents. Data were collected by distributing questionnaires to respondents, specifically students who have used games to learn financial education. The collected data were then analyzed using Variational Bayesian Structural Equation Modeling (VB SEM). This method is employed because it offers a flexible and efficient approach to estimating complex models, particularly when dealing with large datasets or intricate relationships between variables. It combines the strengths of structural equation modeling (SEM) with Bayesian inference, allowing for the incorporation of prior information and the handling of uncertainty in parameter estimates.

## Result and Discussion

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The test results include both the outer model and inner model assessments. The outer model assessment, which includes validity and reliability tests, is presented in Table 1.

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Table 1. Validity and Reliability Test Results

Variable	Indicator	Loading Factor	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Gamification	GM1	0.938	0.969	0.976	0.89
	GM2	0.917			
	GM3	0.963			
	GM4	0.946			
	GM5	0.952			
Student Enjoyment	SE1	0.957	0.973	0.979	0.904
	SE2	0.947			
	SE3	0.949			
	SE4	0.955			
	SE5	0.947			
Student Financial Knowledge	SFK1	0.937	0.977	0.982	0.914
	SFK2	0.961			
	SFK3	0.963			
	SFK4	0.958			
	SFK5	0.962			
Student Engagement	SG1	0.956	0.967	0.976	0.91
	SG2	0.954			
	SG3	0.945			



SG4 0.961

Based on the test results in Table 1, all indicators are deemed valid as they have loading values greater than 0.7. Validity is further supported by the Average Variance Extracted (AVE) results from the Smart PLS analysis, which exceed 0.5, indicating good convergent validity for the constructs. The reliability test results also show that all variables are reliable, with Cronbach's Alpha and Composite Reliability values exceeding 0.7

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Table 2. R-Squared Test Results

Variable	R Square	R Square Adjusted
Student Engagement	0.928	0.928
Student Enjoyment	0.898	0.898
Student Financial Knowledge	0.895	0.894

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Table 2 shows that the R-squared value exceeds 0.8, indicating that the model has very high predictive power. This means that more than 80% of the variance in the dependent variable can be explained by the independent variables included in the model.

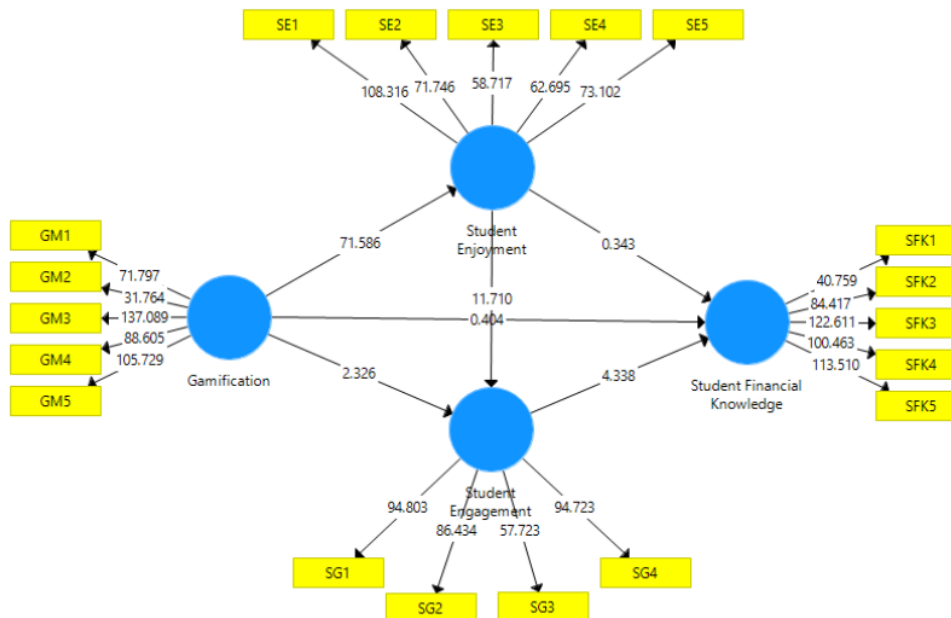


Figure 1. Research Framework

Table 3. Direct Effect Result



	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values
Gamification → Student Engagement	0.166	0.16	0.071	2.326	0.020
Gamification → Student Enjoyment	0.948	0.946	0.013	71.586	0.000
Gamification → Student Financial Knowledge	0.034	0.036	0.084	0.404	0.686
Student Engagement → Student Financial Knowledge	0.856	0.814	0.197	4.338	0.000
Student Enjoyment → Student Engagement	0.805	0.81	0.069	11.71	0.000
Student Enjoyment → Student Financial Knowledge	0.061	0.099	0.177	0.343	0.732

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Table 4. Indirect Effect Result

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values
Gamification → Student Engagement → Student Financial Knowledge	0.142	0.132	0.072	2.068	0.046
Gamification → Student Enjoyment → Student Financial Knowledge	0.057	0.094	0.167	0.343	0.732
Student Enjoyment → Student Engagement → Student Financial Knowledge	0.689	0.656	0.158	4.372	0.000

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19 The results of the study, as depicted in Figure 1, and detail 5 in the direct effects shown in Table 3 and the indirect effects shown in Table 4, indicate that gamification has a direct impact on student engagement and student enjoyment, but it does not directly influence students' financial knowledge. The findings reveal a direct impact of student enjoyment on student engagement, suggesting that enjoyable gamification plays a role in enhancing students' enjoyment while learning financial education. The study also shows that student enjoyment does not directly affect students' financial knowledge. However, the results demonstrate a direct influence of student engagement on financial knowledge. Regarding indirect effects, the findings indicate that student enjoyment does not mediate the relationship between gamification and financial knowledge. In contrast, student engagement does mediate the impact of gamification on financial knowledge. Additionally, student enjoyment partially mediates the effect of gamification on student engagement.

The study found that gamification directly influences both student engagement and student enjoyment. This aligns with existing literature that emphasizes the motivational power of gamified learning environments. The enjoyment derived from such experiences likely stems from the interactive and dynamic nature of games, which can make learning more appealing and less daunting (Prawiyogi et al., 2021). This enjoyment fosters greater engagement, as students are more inclined to participate actively in learning activities when they find them pleasurable. The findings of recent studies suggest a direct effect between gamification and student engagement. Hartt et al., (2020) revealed that gamified learning experiences could increase student motivation and participation. This increase in engagement is often attributed to the interactive nature of gamified elements which encourage students to immerse themselves in the learning process, thereby enhancing their overall educational



experience. However, the findings also reveal that while student enjoyment positively impacts engagement, it does not directly enhance financial knowledge. This suggests that enjoyment alone, although a crucial component of student engagement, may not be sufficient to drive cognitive gains in complex domains like financial literacy.

The results indicate that while students may be motivated and actively participating due to the enjoyment factor, this does not necessarily lead to the deep, reflective thinking required for mastering financial concepts. Moreover, the study indicates that student enjoyment plays a crucial role in fostering engagement. When students enjoy the learning process, they are more likely to engage deeply with the material presented. For instance, a case study involving high school students participating in a gamified financial literacy program showed that those who found the activities enjoyable demonstrated higher levels of engagement and retention of financial concepts (Ariff et al., 2022). Student enjoyment is a critical factor influencing engagement and learning outcomes. Mosalanejad & Mansouri (2023) highlighted that students who experience enjoyment in learning activities are more likely to engage in self-directed learning and exhibit persistence in challenging tasks. Furthermore, Nguyen-Viet & Nguyen-Viet (2023) results indicate that students' willingness to participate in class activities was directly influenced by their positive learning experiences. This research emphasizes how important it is to include fun components in teaching methods, especially when it comes to areas like financial education that students could find difficult. A fun learning environment motivates teachers to raise student engagement and motivation, which eventually improves academic performance. The correlation between financial knowledge and engagement is particularly significant, especially in light of the favorable effects of gamification and student delight on engagement. Research has indicated a positive correlation between enhanced financial literacy results and increased student engagement levels. (Fortuna et al., 2023; Yulianto & Wijaya, 2022). Feroz et al., (2022) demonstrated that students who actively participated in financial education programs exhibited a significant increase in their financial knowledge.

The findings of the current study indicate that while student enjoyment does not directly influence financial knowledge, increased engagement does. This suggests that engagement acts as a mediating factor in the relationship between gamification and financial literacy. As students engage more deeply with gamified content, they are likely to acquire and retain financial knowledge more effectively (Linciano, 2021). This emphasizes how crucial it is to create educational interventions that purposefully increase engagement in addition to emphasizing enjoyment in order to improve learning results. The results of this study show that the relationship between gamification and financial knowledge is considerably mediated by student participation. This suggests that students' comprehension of financial topics significantly increases when they actively participate in gamified learning sessions. Previous studies have demonstrated that gamification—the integration of game-like aspects into educational environments—increases student enthusiasm and engagement (Fitria, 2023). The result is consistent with previous research, which indicates that when students are actively involved in their learning processes, they retain information more effectively and apply it to practical situations. Specifically, gamification, which incorporates game-like elements into educational contexts, has been shown to enhance motivation and participation among students, leading to a deeper understanding of complex subjects such as finance (Bayuk & Altobello, 2019).

In particular, the findings show that students' financial knowledge increases with increased engagement with gamified information. The moderating function of student





participation in the relationship between gamification and financial knowledge is one of the study's main findings. Engagement, as opposed to enjoyment, was proven to have a direct impact on students' financial literacy. This shows that gamification's ability to both make studying enjoyable and actively involve students in a way that fosters deep learning may be a determining factor in how effective it is at enhancing educational outcomes. This is consistent with earlier studies that highlight the value of participation in educational settings. (Bilro et al., 2021). Gamification appears to be the key element that can close the gap between fun and knowledge gain in terms of student engagement. Studies show that students are more likely to gain a deeper comprehension of the subject matter when they actively participate in their learning processes. Specifically, gamification techniques—like adding game-like aspects to educational assignments—have been demonstrated to greatly increase student engagement and motivation. In order to comprehend and remember complex financial information, students are encouraged to devote more time, energy, and mental resources to their learning activities as a result of this increased engagement (Wang et al., 2017). The integration of gamification in educational settings not only fosters a sense of enjoyment but also facilitates a more interactive and dynamic learning environment. Studies have demonstrated that students exposed to gamified learning experiences tend to exhibit higher levels of persistence and resilience when faced with challenging concepts (Yau & Wong, 2022). According to this research, gamification has the potential to make usually monotonous subjects more interesting, which would eventually increase academic performance. The association between gamification and financial knowledge is not primarily driven by student enjoyment, as was found to have a partly mediation influence on student involvement. Nonetheless, enjoyment does contribute to engagement. This result emphasizes how intricately various variables interact, suggesting that educators need to take a variety of aspects into account when creating gamified learning environments.

The study's conclusions also show that the relationship between gamification and financial knowledge is not mediated by student happiness, indicating that increasing learning enjoyment alone is insufficient to guarantee knowledge increases. This is due to the fact that, although though enjoyment can boost motivation and lower anxiety, it can also result in a more cursory engagement with the subject matter. Students may enjoy the process without properly internalizing the material if the enjoyment is not accompanied by strong cognitive involvement (Wirani et al., 2021). Additionally, the results showed that students who expressed greater satisfaction with gamified activities had a tendency to interact more thoroughly with the material, which improved their memory of financial concepts. This shows that enjoyment is important for creating the engagement required for effective learning, even though it does not immediately improve knowledge acquisition.

## Conclusion

Examining the framework of gamification, student engagement, enjoyment, and financial knowledge in educational contexts is the goal of this research. The results show that while gamification successfully raises student engagement and enjoyment, it has no direct influence on financial knowledge. In particular, student enjoyment unable to promote in-depth understanding of financial topics, even though it can be helpful for inspiring and involving students. Rather, the association between gamification and financial knowledge is



significantly mediated by **student** engagement, indicating that meaningful engagement is critical to converting engaging learning experiences into meaningful educational outcomes. The study emphasizes how crucial it is to create gamified learning environments that pique students' attention, make studying fun, and promote critical thinking and active engagement.

### **Recommendation**

Educator and instructional designers should concentrate on developing well-rounded learning experiences that combine academic rigor with enjoyment to make sure students not only connect with the material but also make meaningful learning progress. These findings have important ramifications for teachers and curriculum designers who want to improve financial literacy by using creative teaching strategies. It seems that the key to optimizing learning results is for educators to design gamified experiences that are both entertaining and engaging. Future studies could examine the precise gamification components that work best to raise student engagement and how to best utilize them to increase retention of the material. Furthermore, studying various academic settings and topic areas may offer a more thorough comprehension of how gamification affects learning in a variety of fields.

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